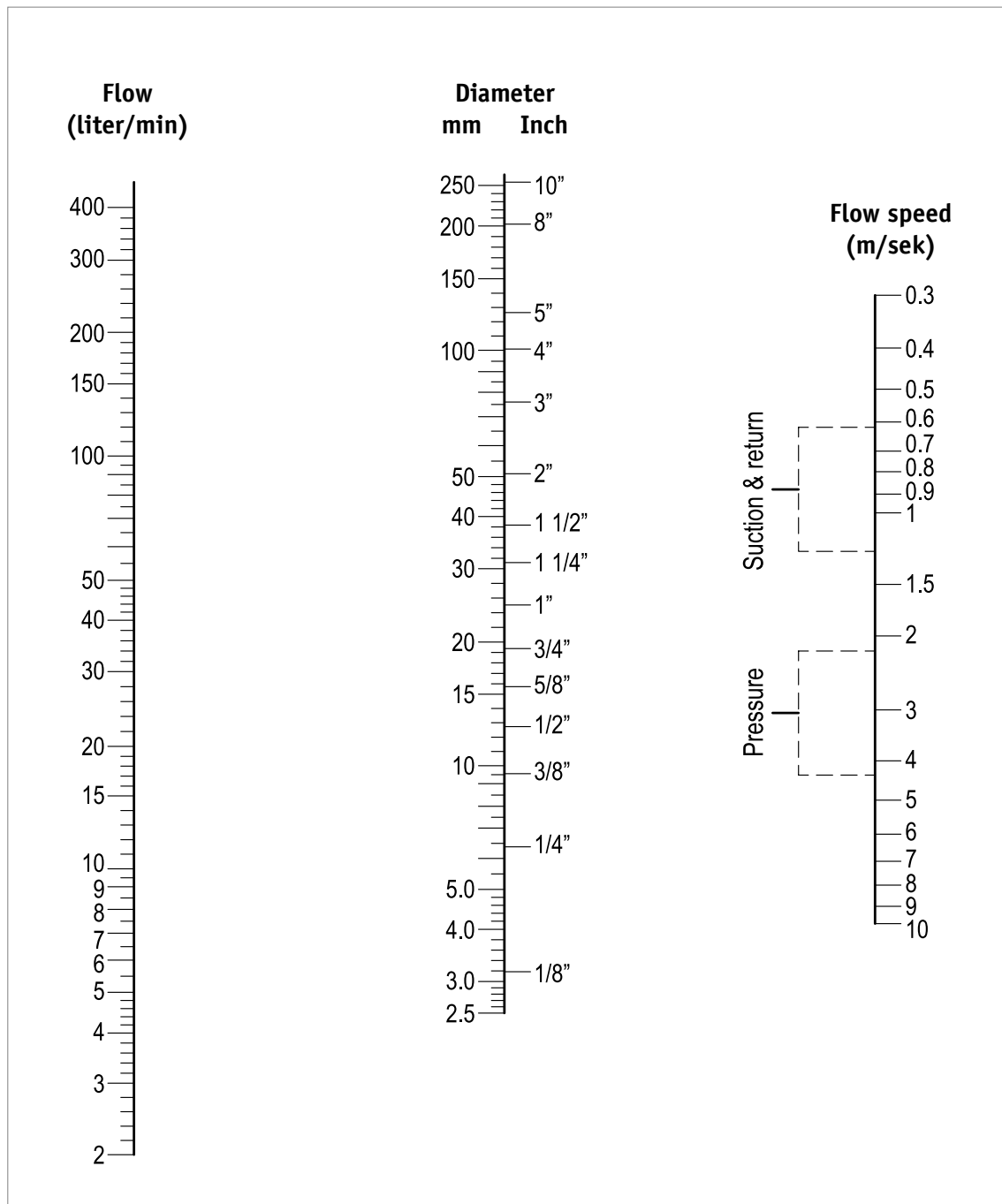




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HOSE DIMENSIONING



The above monogram is based on a laminar flow. A higher flow rate can be used in many applications. If so, consideration should be taken to tank volume, outside temperature and if the hydraulic aggregate will operate for long or short periods of time. A scant dimensioning results in increased oil temperature.



FLOW DIAMETER

DETERMINING TUBE SIZE FOR HYDRAULIC SYSTEMS

Proper tube material, type and size for a given application and type of fitting is critical for efficient and trouble free operation of the fluid system. Selection of proper tubing involves choosing the right tube material, and determining the optimum tube size (O.D. and wall thickness).

A tube that is too small causes high fluid velocity, which has many detrimental effects. In pressure lines, it causes high friction losses and turbulence, both resulting in high pressure drops and heat generation. High heat accelerates wear in moving parts and rapid aging of seals and hoses, all resulting in reduced component life. High heat generation also means wasted energy, and hence, low efficiency.

DETERMINE REQUIRED FLOW DIAMETER

Use table to determine recommended flow diameter for the required flow rate and type of line. The table is based on the following recommended flow velocities:

Pressure lines - 3 --> 5 $\left[\frac{\text{m}}{\text{s}} \right]$

Avoid flow rates > 8 m/s!
The resulting forces are high and can destroy the tube lines.

Return lines - 2 --> 4 $\left[\frac{\text{m}}{\text{s}} \right]$

Suction lines - 1 $\left[\frac{\text{m}}{\text{s}} \right]$

Max flow l/min	Flow diameter in millimeter		
	5 m/s Pressure lines	3 m/s Pressure lines	1 m/s Pressure lines
1	2.1	2.7	4.6
2	2.9	3.8	6.5
3	3.6	4.6	8.0
4	4.1	5.3	9.2
5	4.6	6.0	10.3
6	5.1	6.5	11.3
7	5.5	7.0	12.2
8	5.8	7.5	13.0
9	6.2	8.0	13.8
10	6.5	8.4	14.6
12	7.1	9.2	16.0
14	7.7	10.0	17.2
16	8.2	10.6	18.4
18	8.7	11.3	19.6
20	9.2	11.9	20.6
22	9.7	12.5	21.6
24	10.1	13.0	22.6
26	10.5	13.6	23.5
28	10.9	14.1	24.4
30	11.3	14.6	25.3
32	11.7	15.1	26.1
34	12.0	15.5	26.9
36	12.4	16.0	27.7
38	12.7	16.4	28.4
40	13.0	16.8	29.2
45	13.8	17.9	30.9
50	14.6	18.8	32.6
55	15.3	19.7	34.2
60	16.0	20.6	35.7
65	16.6	21.5	37.2
70	17.2	22.3	38.6
75	17.9	23.1	39.9
80	18.4	23.8	41.2
85	19.0	24.5	42.5
90	19.6	25.3	43.7
95	20.1	25.9	44.9
100	20.6	26.6	46.1
110	21.6	27.9	48.4
120	22.6	29.2	50.5
130	23.5	30.3	52.6
140	24.4	31.5	54.5
150	25.3	32.6	56.5
160	26.1	33.7	58.3
170	26.9	34.7	60.1
180	27.7	35.7	61.8
190	28.4	36.7	63.5
200	29.2	37.6	65.2
220	30.6	39.5	68.4
240	31.9	41.2	71.4
260	33.2	42.9	74.3
280	34.5	44.5	77.1
300	35.7	46.1	79.8
320	36.9	47.6	82.5
340	38.0	49.1	85.0
360	39.1	50.5	87.5
380	40.2	51.9	89.9
400	41.2	53.2	92.2
450	43.7	56.5	97.8
500	46.1	59.5	103.1

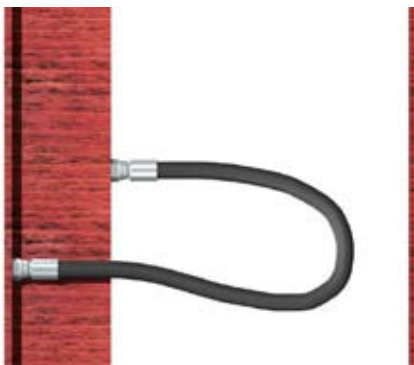


INSTALLATION EXAMPLES

WRONG



RIGHT





CALCULATION OF HOSE LENGTH

In the majority of hose installations, the hose assembly is required to have at least one bend. It is therefore essential to avoid all tensions in the end fittings in order to obtain the maximum life expectancy of the hose.

The following information is intended to provide designers a guide for correct hose length calculation.

Static INSTALLATION

$$\text{Length} = 2A + (3,14 \times R)$$

$$\text{Length} = 2A + X$$

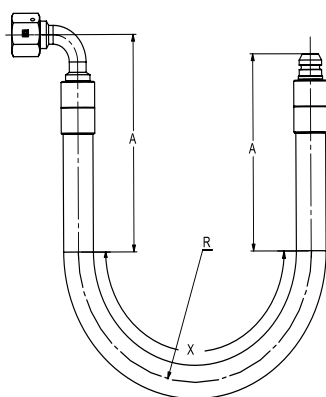


Fig. 1

In order to avoid tensions in the end fittings, both ends of a short hose should allowed to be straight, so that the bend starts way from the fittings.

The calculated distance (A), showed in the figures above, is a recommended distance to cover for both the fitting and the straight part of the hose. The different diameter parameters are available in the table below.

Thus, the hose length of the example in Fig. 1 should be $L = 2A + (3,14 \times R)$ (where R should not be smaller than the recommended minimum bend radius for each hose dimension).

For all other types of bends, the general formula $L = 2A + X$ should cover each installation (where X is the length of the hose bend, which should be suitable calculated or measured).

Flexible INSTALLATION

$$\text{Length} = 2A + X + T$$

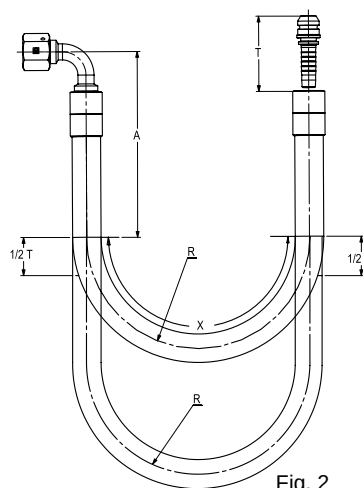


Fig. 2

If the installation is flexible, special consideration concerning the hose length must be taken. It is of course necessary to allow an extra "straight hose" to relieve the tension at the end fittings when the hose is being flexed.

Thus, if the hose length is T, the extra length should at each fitting be $1/2 T$.

The general formula is $L = 2A + X + T$. This additional length (T) will permit reasonable flexing in all directions.

Diam.	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"
"A" mm.	105	115	130	140	155	175	200	225	255

Note: The distance (A) does not include the length of special fittings or adapters. If these are included in the installation, extra length must be added to the distance (A).



WORKING PRESSURE, HYDRAULIC HOSE (MPa)

Hose Dimension Hose Type	02	03	04	05	06	08	10	12	16	20	24	32	Work temp. C°
1003-10 SAE 100 100 R1AT – Red			19.0		15.5	14.0		8.5	7.0				-40 – +100
1014 Blastopak			100.0		100.0	100.0		100.0	80.0				-40 – +120
1015 Deltaflex			50.0		44.5	41.5	39.0	35.0	31.0	28.0	26.0	21.0	-40 – +100
1015-14 Deltaflex CO			50.0		44.5	41.5	39.0	35.0	31.0	28.0	26.0	21.0	-40 – +100
1031-01 HYDROSCAND T1111		30.0	27.5	21.5	21.2	17.5	14.0	11.5	9.5				-40 – +100
1032 HYDROSCAND T1112 Twin													
1032 HYDROSCAND T1113 Triplet			27.5		21.2								-40 – +100
1034-01 HYDROSCAND T1211					33.0	26.0							-40 – +100
1036 HYDROSCAND T1212 Twin					33.0	26.0							-40 – +100
1037-01 HYDROSCAND T1121 Spray paint hose		36.2	31.0		22.4	19.0							-40 – +100
1038-01 HYDROSCAND T1221 Spray paint hose			40.0	33.0	26.0								-40 – +100
1045-01 HYDROSCAND T7011	21.0	21.0	21.0	17.5	16.0	14.0		9.0	7.0				-40 – +100
1047 Supertwin T7012 Twin		21.0	21.0	17.5	16.0	14.0							-40 – +100
1049-01 HYDROSCAND T8011		35.0	35.0	28.0	24.5								-40 – +100
1052 HYDROSCAND T8012 Supertwin Twin					28.0	24.5							-40 – +100
1054 High Pressure Water Cleaning Hose HTC-1C			33.0	28.0	33.0	27.0							-40 – +155
1055 High Pressure Water Cleaning Hose HTC-2C				45.0	45.0	36.0							-40 – +155
1056-1 HYDROSCAND T3311			80.0										-40 – +100
1058-1 HYDROSCAND T3211			70.0		70.0								-40 – +100
1059-01 HYDROSCAND T8081			35.0		28.0	24.5							-40 – +100
1071 HI-TEMP			22.5		18	16	13	10.5	8.8	6.3	5	4	-40 – +150
1075 Compactflex			34.5	29.5	27.5	24.0	19.0	15.5					-40 – +100
1087 Marion 2XA			40.0		35.0	30.0	27.5	23.5	18.5				-40 – +100
1091 P.T.F.E. hose convoluted			13.8		11.2	7.8	6.8	5.2	3.5				-70 – +230
1092-01 P.T.F.E. hose	24.2	19.8	16.8	15.5	13.8	12.1	8.6	7.8	6.0				-60 – +260
1093-01 P.T.F.E. hose			17.3	16.0	13.8	12.4	8.6	7.8	5.3				-60 – +260
1094 P.T.F.E. hose, tape wrapped convoluted					6.9	8.6	9.6	7.6	6.9	6.9	5.2	3.4	-54 – +204
1095 P.T.F.E. hose, two braids of stainless steels			19.8		19.0	14.7							-60 – +260
1101-00 Egeflex1		25.0	22.5	21.5	18.0	16.0	13.0	10.5	8.8	6.3	5.0	4.0	-40 – +100
1101-14 Egeflex 1CO		25.0	22.5	21.5	18.0	16.0	13.0	10.5	8.8	6.3	5.0	4.0	-40 – +100
1102-00 Egeflex2		41.5	40.0	35.0	33.0	27.5	25.0	21.5	16.5				-40 – +100
1102-14 Egeflex 2CO		41.5	40.0	35.0	33.0	27.5	25.0	21.5	16.5	12.5	9.0	8.0	-40 – +100
1102-44 Egeflex 2PO			40.0		33.0	27.5							-50 – +100
1103-03 Kappaflex1			29.0	25.0	23.0	20.0	15.0	12.5	11.0	10.0			-40 – +100
1105-10 Kappaflex 2CO			45.0	42.0	38.5	34.5	29.0	28.0	20.0				-40 – +100
1106-03 Kappaflex3						47.0	41.0	37.5	32.7				-40 – +100
1110-00/-03 IsoBar 10					10	10							-40 – +100
1118-02 Gammaflex 5								42.0	38.0	32.5	29.0	25.0	-40 – +100
1142-14 IsoBar42 / 1135-14 IsoBar 35 CO								42.0	42.0	42.0	42.0	34.5	-40 – +121
1201-11 SpirStar type 2W	140.0		128.0	100.0	92.0	100.0							-30 – +80
1201-30 SpirStar type 4	216.0	180.0	150.0	150.0	150.0	128.0	100.0	100.0					-30 – +80
1201-40 SpirStar type 6	280.0	262.0		200.0	192.0	168.0		140.0					-30 – +80
1201-46 SpirStar type 6H		280.0		250.0									-30 – +80

1 MPA = 10 BAR
1 BAR = 14,5 PSI
Safety factor 4:1



CLASSIFICATION OF HOSE LENGTH

HOW TO MEASURE THE HOSE WHEN ORDERING A PRE-ASSEMBLED HOSE:

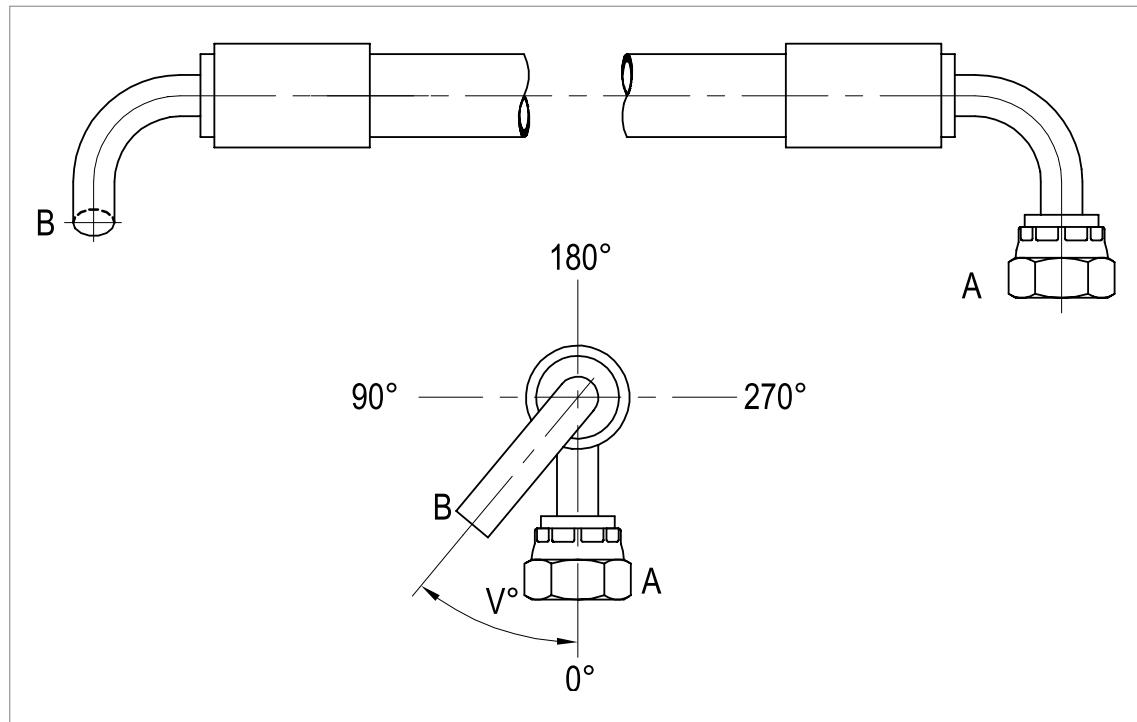
Length between sealing surface FS fittings	Length between sealing surface M fittings
Length between sealing surface FS and M fittings	Length between sealing surface Straight standpipe and fittings
Length between the angels center lines 90° and 45° fittings	Length between the angels center lines 90° and 45° fittings
Length between the pipe bend centre lines 90° SAE flange fittings	Length between the pipe bend centre lines and the sealing surface of the flange Straight 45° SAE flange fittings

TOLERANCE FOR ASSEMBLED HOSES

Hose length (mm)	Tolerance
0 – 300	+/- 3 mm
300 – 1 000	+/- 6 mm
1 000 –	+/- 1 %, ex. 40 mm at a hose length of 2,000 mm



ANGULAR RELATIONSHIP



Fitting (A) has position 0°. Turn fitting (B) to a defined angle (V)°. The angle tolerance is $\pm 3^\circ$.

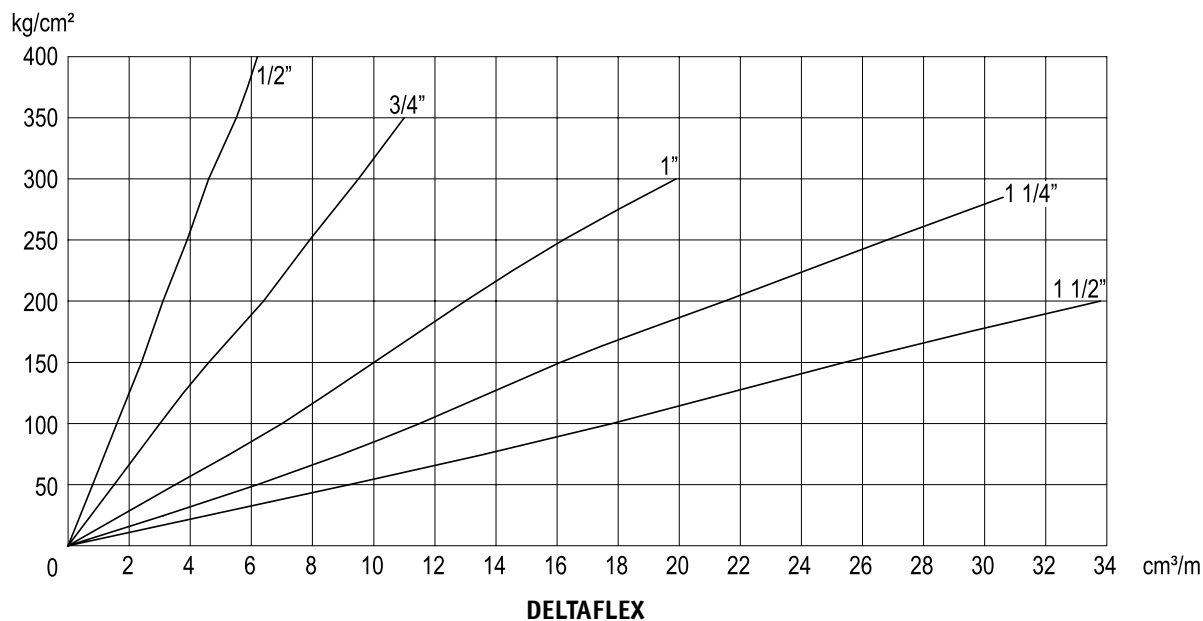
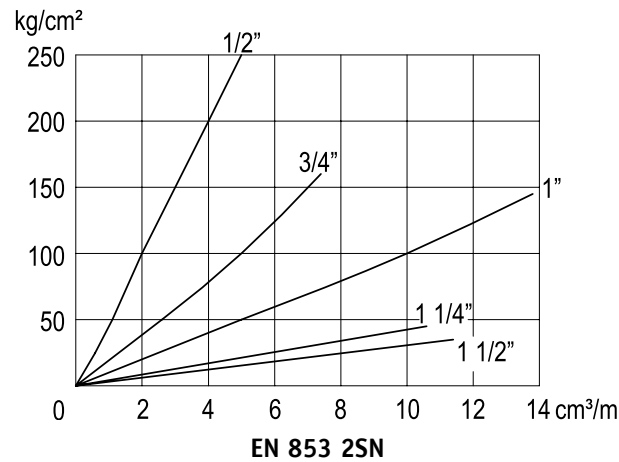
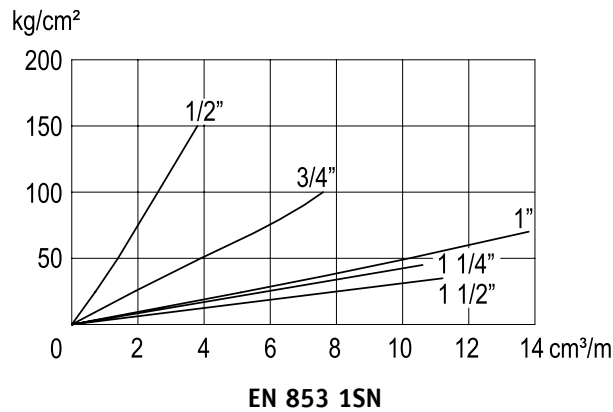


ABBREVIATIONS FOR POLYMERIC MATERIALS

BR	Butadiene rubber
CM	Chloroten rubber
CR	Chloroprene rubber
CSM	Chlorosulfonated polyethylene (Hypalon)
EPDM	Ethylene-propylene rubber
EPM	Ethylene-propylene rubber
IR	Butyl rubber
NBR	Nitrile rubber
NR	Natural rubber
PA	Polyamide
PE	Polyethylene
PEL	Polyethylene
P.T.F.E.	Polytetrafluoro ethylene (Teflon)
PU	Polyurethane
PVC	Polyvinyl chloride
SBR	Styrene butadiene rubber
UPE	Ultra high molecular weight polyethylene
XLPE	Cross linked polyethylene

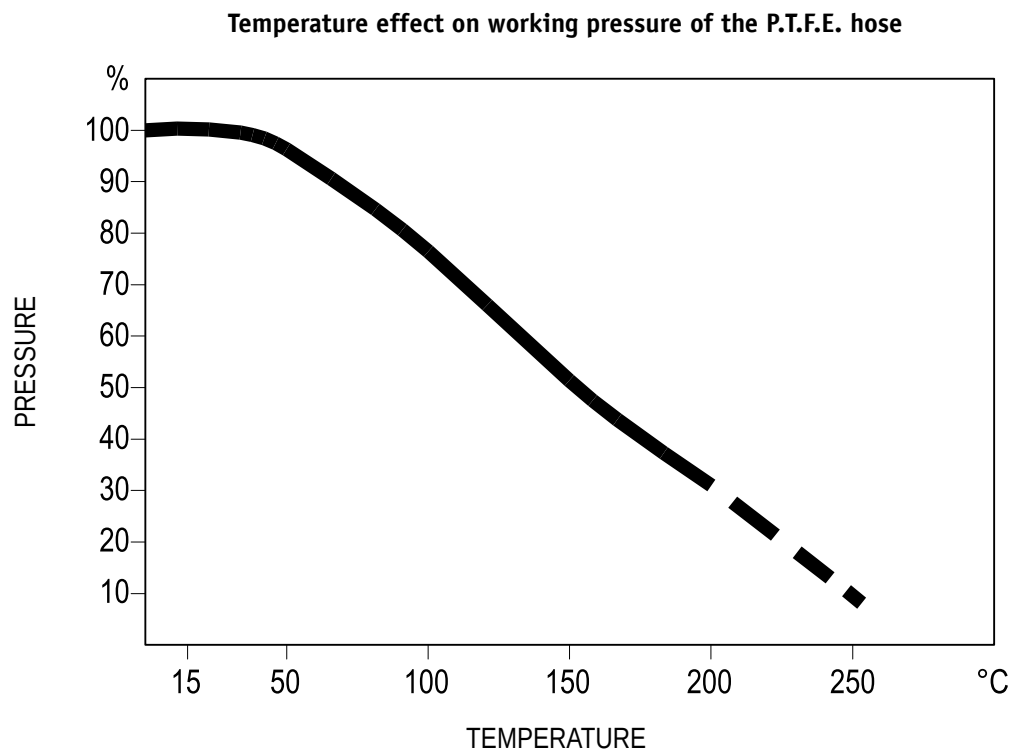


VOLUMETRIC EXPANSION





TEMPERATURE EFFECT

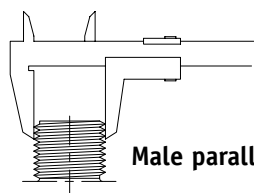


VACUUM TRANSFORMATION TABLE

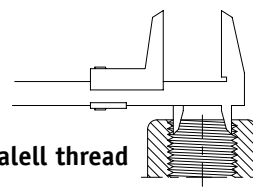
ATM	PSI	Water meter	Quicksilver mm	%
0.1	1.4	1	73.6	10
0.2	2.8	2	147.1	20
0.3	4.2	3	220.7	30
0.4	5.7	4	249.2	40
0.5	7.1	5	267.8	50
0.6	8.5	6	441.3	60
0.7	10.0	7	514.9	70
0.8	11.4	8	588.4	80
0.9	12.8	9	662.0	90
1.0	14.2	10	735.5	100



THREAD TABLE



Male parallel thread

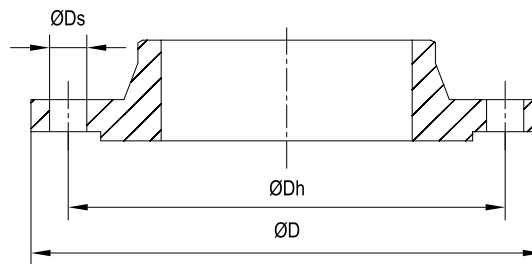


Female parallel thread

External diameter mm	Pipe thread Conical pipe thread	Metric thread	Unified thread	NPTF / NPSM	Internal diameter mm
6,9 – 7,3				1/16" – 27	6,7 – 7,1
7,5 – 7,7	1/16" – 28				6,6 – 6,8
9,2 – 9,7				1/8" – 27	9,1 – 9,5
9,5 – 9,7	1/8" – 28				8,6 – 8,8
9,7 – 9,9		M10 x 1,5			8,2 – 8,6
10,9 – 11,1			7/16" – 20 UNF		9,7 – 10,0
12,1 – 12,8				1/4" – 18	11,9 – 12,5
12,5 – 12,7			1/2" – 20 UNF		11,3 – 11,6
12,9 – 13,2	1/4" – 19				11,4 – 11,9
13,6 – 13,9		M14 x 1,5			12,2 – 12,6
14,0 – 14,3			9/16" – 18 UNF		12,8 – 13,1
15,5 – 16,2				3/8" – 18	15,3 – 15,9
15,6 – 15,9		M16 x 1,5			14,2 – 14,6
16,4 – 16,7	3/8" – 19				15,0 – 15,4
17,2 – 17,4			11/16" – 16 UN		15,7 – 16,1
17,6 – 17,9		M18 x 1,5			16,2 – 16,6
18,8 – 19,0			3/4" – 16 UNF		17,3 – 17,7
19,3 – 20,1				1/2" – 14	18,9 – 18,6
20,4 – 20,6			13/16" – 16 UN		18,9 – 19,3
20,7 – 21,0	1/2" – 14				18,6 – 19,2
21,6 – 21,9		M22 x 1,5			20,2 – 20,6
21,9 – 22,2			7/8" – 14 UNF		20,3 – 20,7
22,6 – 22,9	5/8" – 14				20,6 – 21,1
23,6 – 23,9		M24 x 1,5			22,2 – 22,6
24,6 – 25,4				3/4" – 14	24,2 – 25,1
25,1 – 25,4			1" – 14 UNS		23,4 – 23,8
25,6 – 25,9		M26 x 1,5			24,2 – 24,6
26,2 – 26,4	3/4" – 14				24,1 – 24,7
26,7 – 26,9			1 1/16" – 12 UN		24,7 – 25,1
29,6 – 29,9		M30 x 2			27,4 – 27,8
29,8 – 30,1			1 3/16" – 12 UN		27,9 – 28,3
29,6 – 29,9		M30 x 1,5			28,2 – 28,6
29,9 – 30,2	7/8" – 14				27,9 – 28,4
30,8 – 31,9				1" – 11 1/2"	30,4 – 31,5
31,6 – 31,9		M32 x 2			29,4 – 29,9
32,9 – 33,2	1" – 11				30,3 – 30,9
33,0 – 33,3			1 5/16" – 12 UN		31,0 – 31,5
35,6 – 35,9		M36 x 2			33,4 – 33,8
36,2 – 36,5			1 7/16" – 12 UN		34,2 – 34,7
37,5 – 37,9	1 1/8" – 11				34,9 – 35,6
37,6 – 37,9		M38 x 1,5			36,2 – 36,6
39,6 – 40,7				1 1/4" – 11 1/2"	39,1 – 40,2
40,9 – 41,2			1 5/8" – 12 UN		39,0 – 39,4
41,6 – 41,9		M42 x 2			39,4 – 39,8
41,6 – 41,9	1 1/4" – 11				39,0 – 39,6
42,5 – 42,8				1 11/16" – 12 UN	40,6 – 41,0
44,6 – 44,9		M45 x 2			42,4 – 42,8
44,6 – 44,9		M45 x 1,5			43,2 – 43,6
45,6 – 46,8				1 1/2" – 11 1/2"	45,2 – 46,3
47,3 – 47,6			1 7/8" – 16 UN		45,9 – 46,3
47,4 – 47,8	1 1/2" – 11				44,8 – 45,5
50,5 – 50,8			2" – 12 UN		48,5 – 49,0
51,6 – 51,9		M52 x 2			49,4 – 49,6
51,6 – 51,9		M52 x 1,5			50,2 – 50,6
53,4 – 53,7	1 3/4" – 11				50,8 – 51,4
57,6 – 58,8				2" – 11 1/2"	57,2 – 58,3
59,3 – 59,6	2" – 11				56,7 – 57,3
63,1 – 63,4			2 1/2" – 12 UN		61,1 – 61,4
65,3 – 65,7	2 1/4" – 11				62,8 – 63,4
69,1 – 70,9				2 1/2" – 8	68,5 – 70,2
74,8 – 75,2	2 1/2" – 11				72,2 – 72,9
81,1 – 81,5	2 3/4" – 11				78,6 – 79,2
84,9 – 86,8				3" – 8	84,3 – 86,1
87,5 – 87,9	3" – 11				84,9 – 85,6
99,9 – 100,3	3 1/2" – 11				97,4 – 98,0
112,6 – 113,0	4" – 11				110,1 – 110,7



DIN/PN FLANGE DIMENSIONS



According to DIN 2631 PN 6					
DN	D mm	Dh mm	Screw holes pcs	Ds mm	Screw
10	75	50	4	11	M 10
15	80	55	4	11	M 10
20	90	65	4	11	M 10
25	100	75	4	11	M 10
32	120	90	4	14	M 12
40	130	100	4	14	M 12
50	140	110	4	14	M 12
65	160	130	4	14	M 12
80	190	150	4	18	M 16
100	210	170	4	18	M 16
125	240	200	8	18	M 16
150	265	225	8	18	M 16
200	320	280	8	18	M 16
250	375	335	12	18	M 16
300	440	395	12	22	M 20
350	490	445	12	22	M 20
400	540	495	16	22	M 20
500	645	600	20	22	M 20

According to DIN 2634 PN 25					
DN	D mm	Dh mm	Screw holes pcs	Ds mm	Screw
200	360	310	12	26	M 24
250	425	370	12	30	M 27
300	485	430	16	30	M 27
350	555	490	16	33	M 30
400	620	550	16	36	M 33

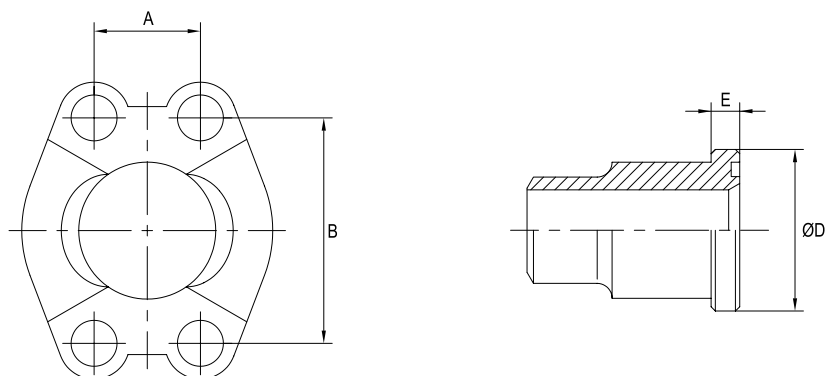
According to DIN 2635 PN 40					
DN	D mm	Dh mm	Screw holes pcs	Ds mm	Screw
80	200	160	4	18	M 16
200	340	295	8	22	M 20
250	395	350	12	22	M 20
300	445	400	12	22	M 20
350	505	460	16	22	M 20
400	565	515	16	26	M 24
500	670	620	20	26	M 24

According to DIN 2633 PN 16					
DN	D mm	Dh mm	Screw holes pcs	Ds mm	Screw
10	90	60	4	14	M 12
15	95	65	4	14	M 12
20	105	75	4	14	M 12
25	115	85	4	14	M 12
32	140	100	4	18	M 16
40	150	110	4	18	M 16
50	165	125	4	18	M 16
65	185	145	4	18	M 16
80	200	160	8	18	M 16
100	220	180	8	18	M 16
125	250	210	8	18	M 16
150	285	240	8	22	M 20
200	340	295	12	22	M 20
250	405	355	12	26	M 24
300	460	410	12	26	M 24
350	520	470	16	26	M 24
400	580	525	16	30	M 27
500	715	650	20	33	M 30

According to DIN 2635 PN 40					
DN	D mm	Dh mm	Screw holes pcs	Ds mm	Screw
10	90	60	4	14	M 12
15	95	65	4	14	M 12
20	105	75	4	14	M 12
25	115	85	4	14	M 12
32	140	100	4	18	M 16
40	150	110	4	18	M 16
50	165	125	4	18	M 16
65	185	145	8	18	M 16
80	200	160	8	18	M 16
100	235	190	8	22	M 20
125	270	220	8	26	M 24
150	300	250	8	26	M 24
200	375	320	12	30	M 27
250	450	385	12	33	M 30
300	515	450	16	33	M 30
350	580	510	16	36	M 33



SAE J518C FLANGE DIMENSIONS



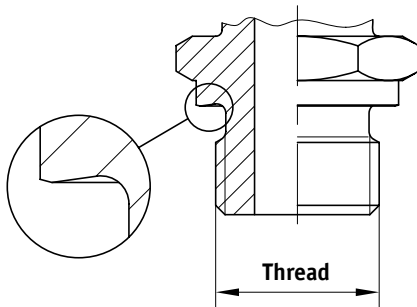
CODE 61 (3000)								
Max. (MPa) Work. press.	Size	Dim- ension	A	B	Bolt dim. metric	Bolt dim. UNC.	D	E
34.5	8	1/2"	17.38	38.1	M 8	5/16"	30.18	6.73
34.5	12	3/4"	22.23	47.63	M10	3/8"	38.10	6.73
34.5	16	1"	26.19	52.37	M10	3/8"	44.45	8.00
27.6	20	1 1/4"	30.18	58.72	M10	7/16"	50.80	8.00
20.7	24	1 1/2"	35.71	69.85	M12	1/2"	60.33	8.00
20.7	32	2"	42.88	77.77	M12	1/2"	71.42	9.53
17.2	40	2 1/2"	50.80	88.90	M12	1/2"	84.12	9.53
13.8	48	3"	61.93	106.38	M16	1/2"	101.60	9.53
3.4	56	3 1/2"	69.85	120.65	M16	5/8"	114.30	11.23
3.4	64	4"	77.77	130.18	M16	5/8"	127.00	11.23
3.4	80	5"	92.08	152.40	M16	5/8"	152.40	11.23

CODE 62 (6000)								
Max. (MPa) Work. press.	Size	Dim- ension	A	B	Bolt dim. metric	Bolt dim. UNC.	D	E
41.4	8	1/2"	18.24	40.49	M8	5/16"	31.75	7.75
41.4	12	3/4"	23.8	50.8	M10	3/8"	41.28	8.76
41.4	16	1"	27.76	57.15	M12	7/16"	47.63	9.53
41.4	20	1 1/4"	31.75	66.68	M14	1/2"	53.98	10.29
41.4	24	1 1/2"	36.5	79.38	M16	5/8"	63.5	12.57
41.4	32	2"	44.45	96.82	M20	3/4"	79.38	12.57

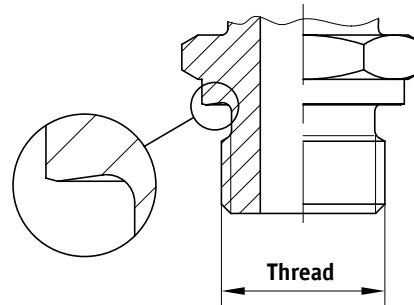
The table above refers to SAE standard SAE J518c.



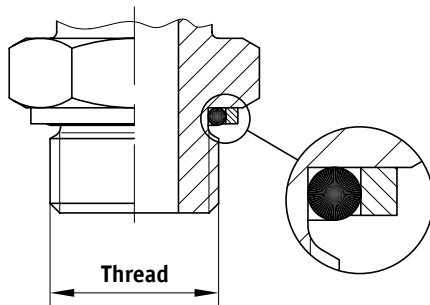
SEALING PRINCIPLES



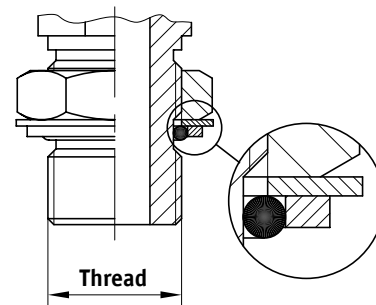
**DIN 3852-2
DESIGN B
ISO 1179-4**



**DIN 3852-11
DESIGN E
ISO 1179-2**



**ISO 1179-3
DESIGN H**



**ISO 1179-4
DESIGN G**



TIGHTENING TORQUE FOR CONNECTION END

NOTE! The following tightening torque can not be applied on the cutting ring connection, see the assembling instructions in chapter 6. Neither can it be applied on banjo fittings or conical threaded fittings.

BSP Tread	Torque (Nm) form B	Torque (Nm) form E,H,G	Metric Thread	Torque (Nm) form B	Torque (Nm) form E,H,G	UN/UNF Thread	Torque (Nm)
G 1/8"	20		M 10x1.0	20			
G 1/8"	20	20	M 10x1.0	20	20	7/16"-20 UNF	20
G 1/4"	45	45	M 12x1.5	30	30	1/2"-20 UNF	25
			M 14x1.5	45	45		
G 3/8"	70	70	M 16x1.5	60	55	9/16"-18 UNF	30
G 1/2"	130	85	M 18x1.5	80	70	3/4"-16 UNF	45
G 1/2"	130	85	M 22x1.5	130	120		
G 3/4"	170	170	M 26x1.5	180	170	1 1/16"-12 UN	85
G 1"	330	330				1 5/16"-12 UN	130
G 1 1/4"	510	430	M 42x2.0	470	430	1 5/16"-12 UN	170
G 1 1/2"	600	510	M 48x2.0	600	510	1 7/8"-12 UN	180
			M 14x1.5	55	55		
			M 20x1.5	150	105		
						7/8"-14 UNF	55
			M 27x2.0	200	170		
			M 33x2.0	390	330		



TIGHTENING TORQUE FOR SWIVEL NUTS ON HOSE FITTINGS AND ADAPTORS

DKLO			DKSO		
Pipe size	Thread	Nm	Pipe size	Thread	Nm
6L	M12 x 1.5	23	6S	M14 x 1.5	26
8L	M14 x 1.5	26	8S	M16 x 1.5	30
10L	M16 x 1.5	30	10S	M18 x 1.5	41
12L	M18 x 1.5	41	12S	M20 x 1.5	53
15L	M22 x 1.5	76	14S	M22 x 1.5	76
18L	M26 x 1.5	106	16S	M24 x 1.5	88
22L	M30 x 2.0	116	20S	M30 x 2.0	116
28L	M36 x 2.0	133	25S	M36 x 2.0	133
35L	M45 x 2.0	173	30S	M42 x 2.0	151
42L	M52 x 2.0	202	38S	M52 x 2.0	202

ORFS				JIC Hose fittings				BSP 60° cone	
Thread size	Tightening Nm	FFWR new	FFWR reassembly	Hose dim.	Thread	FFWR hose	FFWR pipe	Thread size	Tightening Nm
9/16" – 18	25	1/2–3/4	1/4–1/2	3/16	7/16"–20 UNF	2	2	1/8"	20
11/16" – 16	35	1/2–3/4	1/4–1/2		1/2"–20 UNF	2	2	1/4"	25
13/16 – 16	55	1/2–3/4	1/4–1/2	1/4	9/16"–18 UNF	2	1 1/2	3/8"	40
1" – 14	80	1/2–3/4	1/4–1/2	3/8	3/4"–16 UNF	2	1 1/2	1/2"	60
1 3/16" – 12	120	1/3–1/2	1/4–1/2	1/2	7/8"–14 UNF	1 1/2	1 1/2	5/8"	70
1 7/16" – 12	150	1/3–1/2	1/4–1/2	3/4	1.1/16"–12 UN	1	1 1/4	3/4"	115
1 11/16" – 12	180	1/3–1/2	1/4–1/2	1	1.5/16"–12 UN	1	1	1"	140
2" – 12	220	1/3–1/2	1/4–1/2	1 1/4	1.5/8"–12 UN	1	1	1 1/4"	200
2 1/2" – 12	490	1/3–1/2	1/4–1/2	1 1/2	1.7/8"–12 UN	1	1		
				2	2.1/2"–12 UN	1	1	1 1/2"	270
								2"	350

Note! All the tightening torques are based on "dry" tightening (non-lubricated). There is a risk for over-tightening if the same torque is used for lubricated fittings. This is especially important for JIC in small dimensions. For these, the FFWR-method is recommended (see chapter 7:7).

Source:
HS Testlab

**PRESSURE TRANSFORMATION TABLE**

BAR	MPa	Kp / cm ²	PSI	Kpa
1	0.1	1.020	14.503	100
10	1	10.20	145.03	1000
0.9810	0.0981	1	14.233	10
0.0690	0.0069	0.0700	1	6.9
0.01	0.001	0.0102	0.145	1

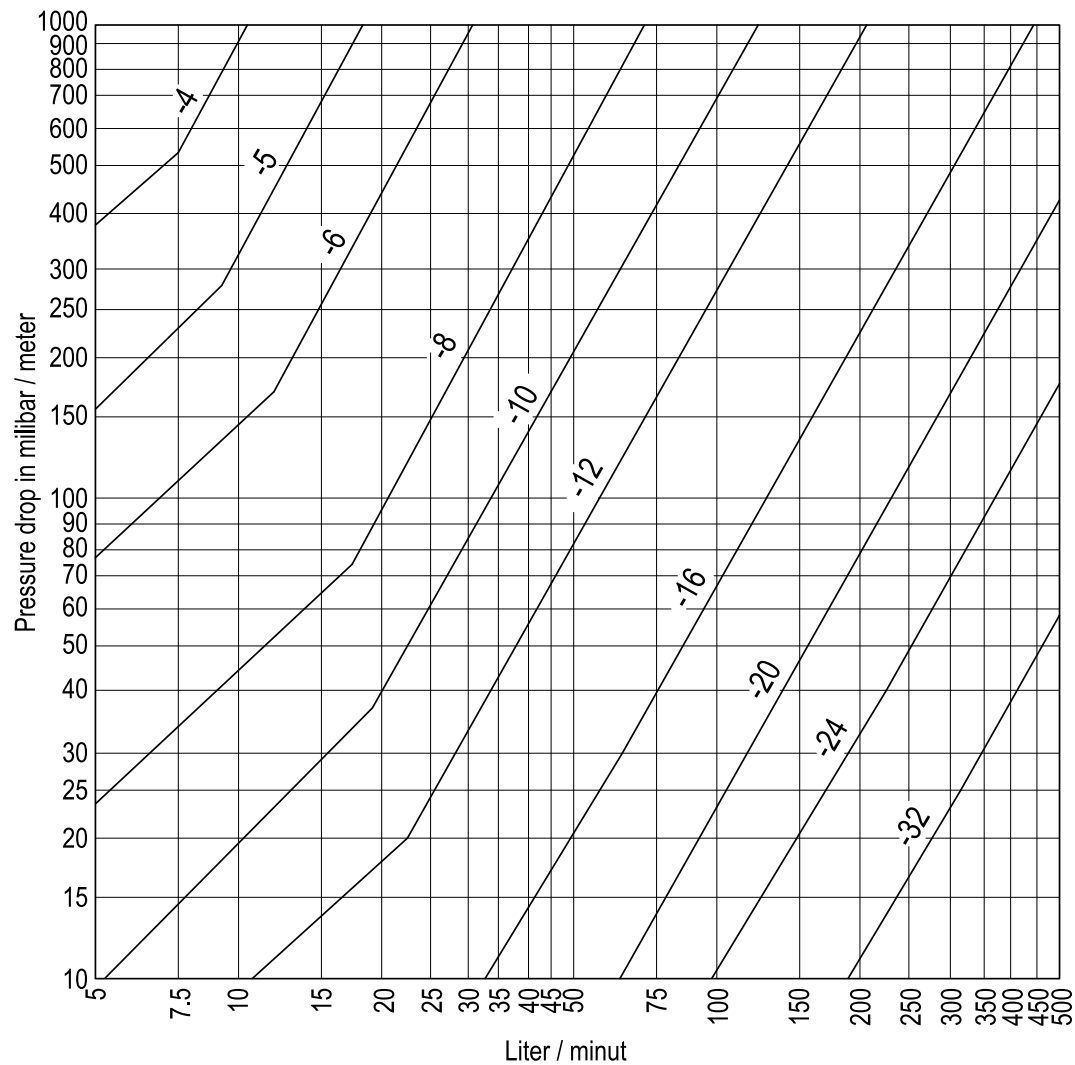
mm	Inche	Foot
1	0.0394	0.0033
25.4	1	0.083
304.8	12	1

VACUUM TRANSFORMATION TABLE

ATM	PSI	Water meter	Quicksilver mm	%
0.1	1.4	1	73.6	10
0.2	2.8	2	147.1	20
0.3	4.2	3	220.7	30
0.4	5.7	4	249.2	40
0.5	7.1	5	267.8	50
0.6	8.5	6	441.3	60
0.7	10.0	7	514.9	70
0.8	11.4	8	588.4	80
0.9	12.8	9	662.0	90
1.0	14.2	10	735.5	100



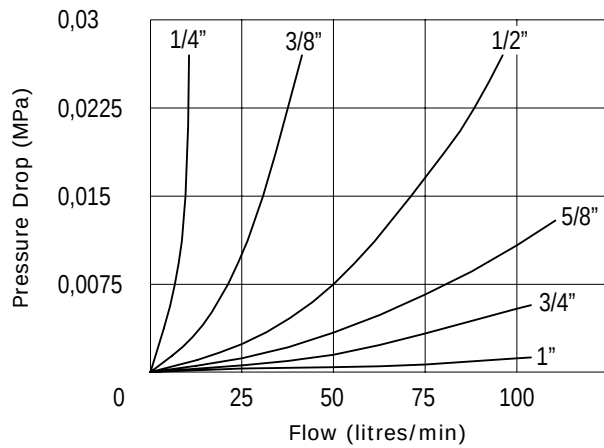
HOSE PRESSURE DROP



Based on 20 CS at 50°C



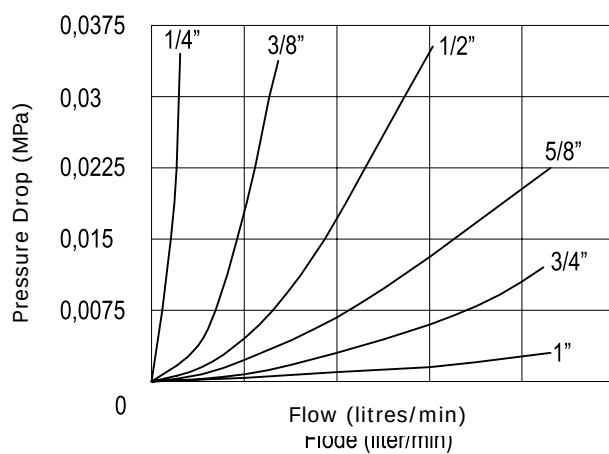
HOSE FITTINGS

**Straight Fittings**

Mineral oil

Viscosity: 20 Centistokes

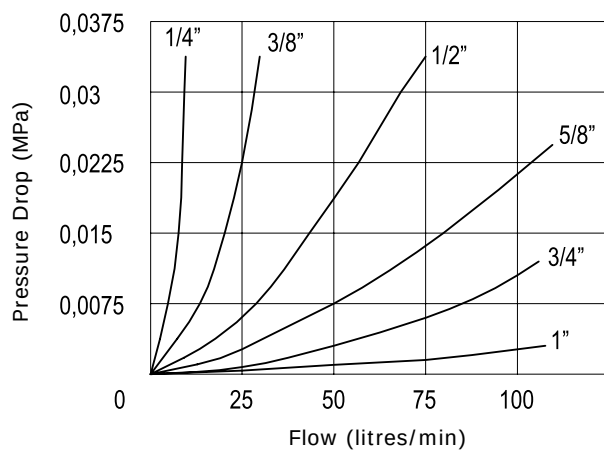
Temperature: 50°C

**90° Pipe bend**

Mineral oil

Viscosity: 20 Centistokes

Temperature: 50°C

**90° Tight bend**

Mineral oil

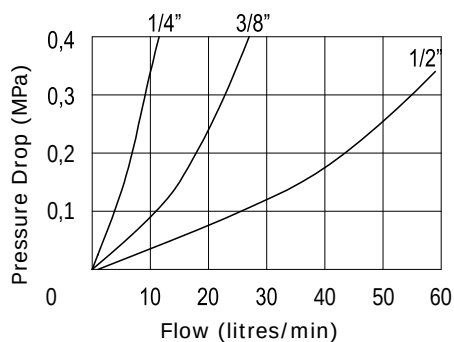
Viscosity: 20 Centistokes

Temperature: 50°C

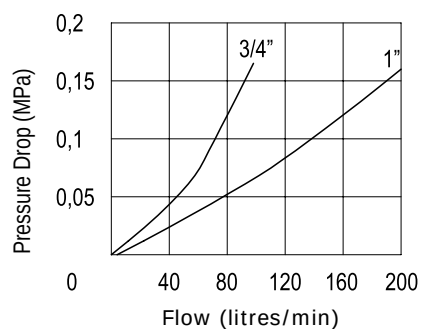


QUICK RELEASE FITTINGS

ISO A 1/4" – 1/2"

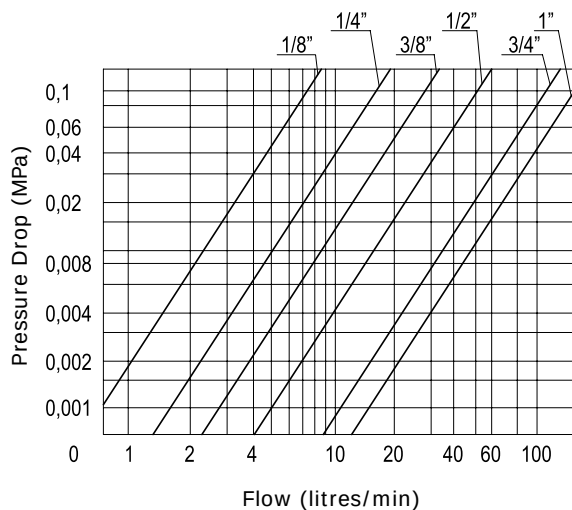


ISO A 3/4" – 1"

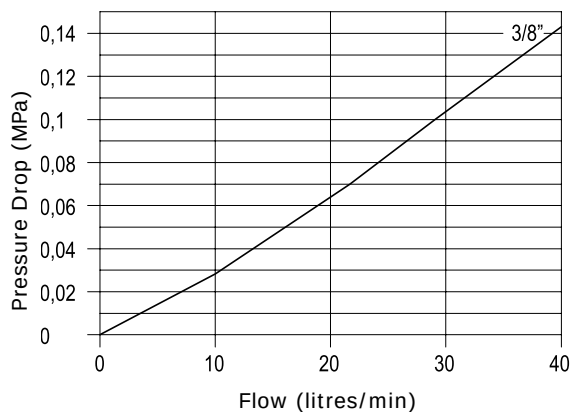


Mineral oil
Viscosity: 80 Centistokes

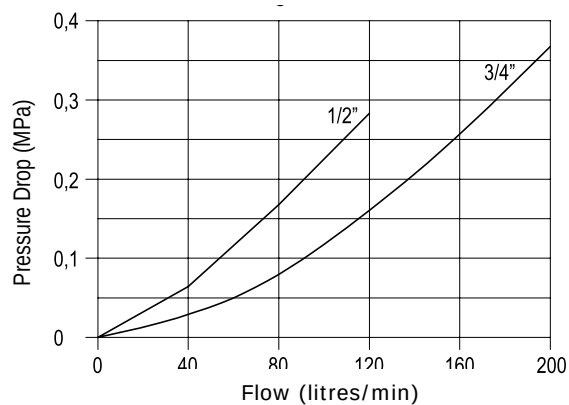
HANSEN Design HKP Water



Brunning FF 370



Brunning FF 500 & 750



Mineral oil
According to MIL-H 5606
Temperature: 38°C

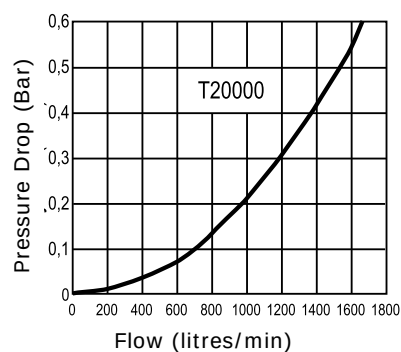
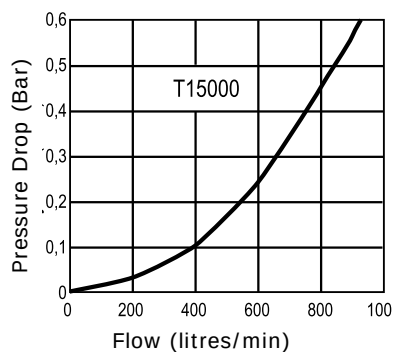
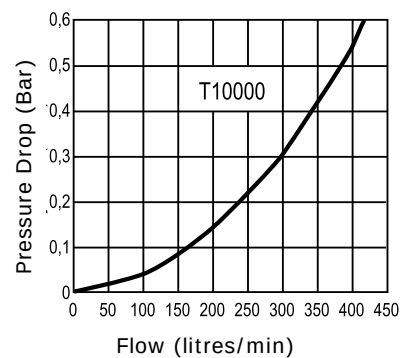
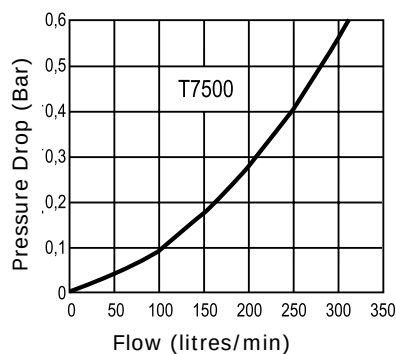
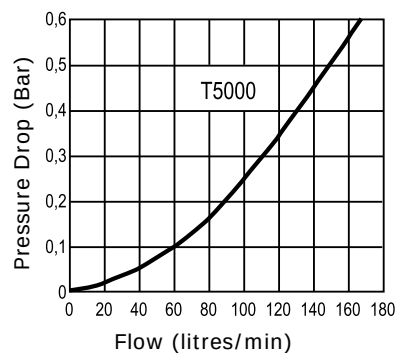
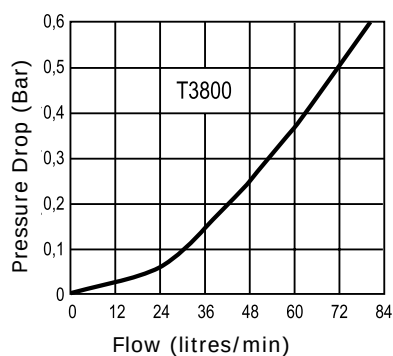
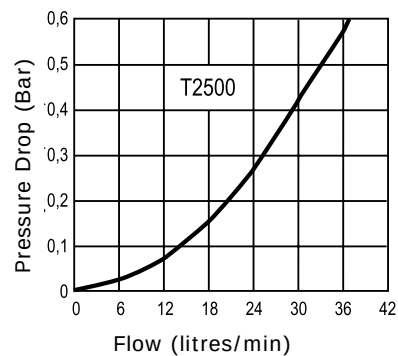
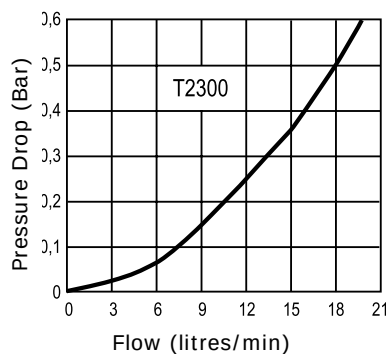


QUICK RELEASE FITTINGS

TEMA T-series

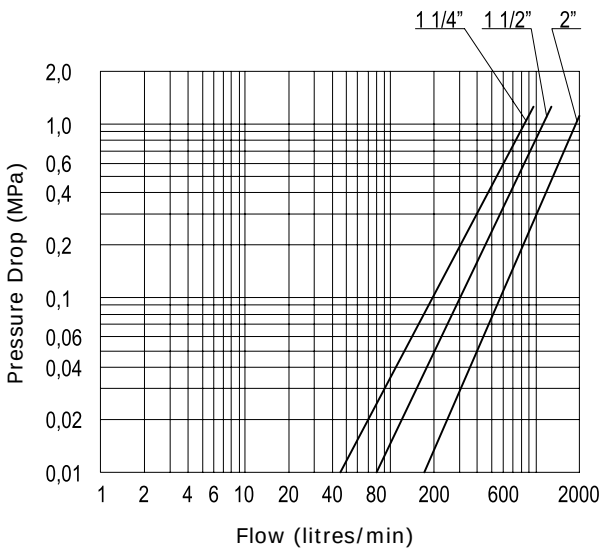
Viscosity 32cSt at 40°C

according to ISO 7241-2:2000



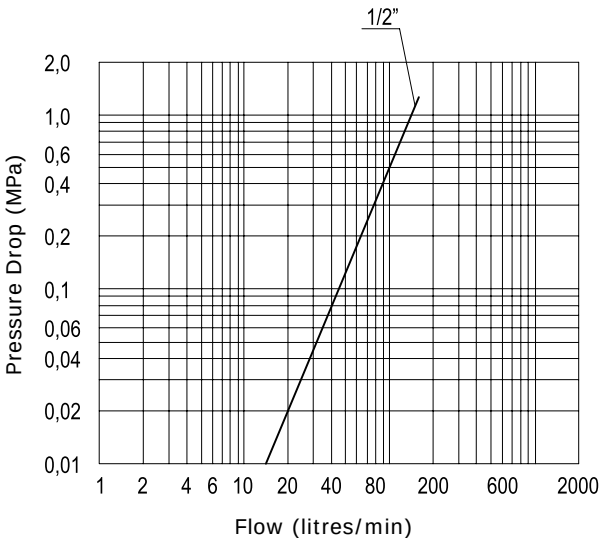


QUICK RELEASE FITTINGS



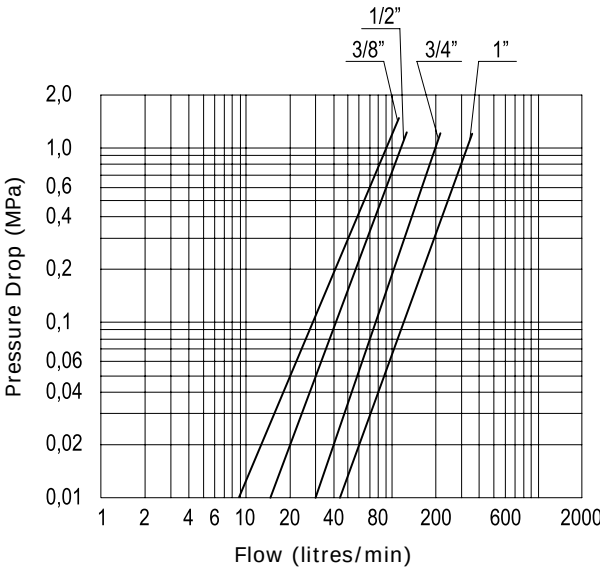
FASTER – NV

Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C



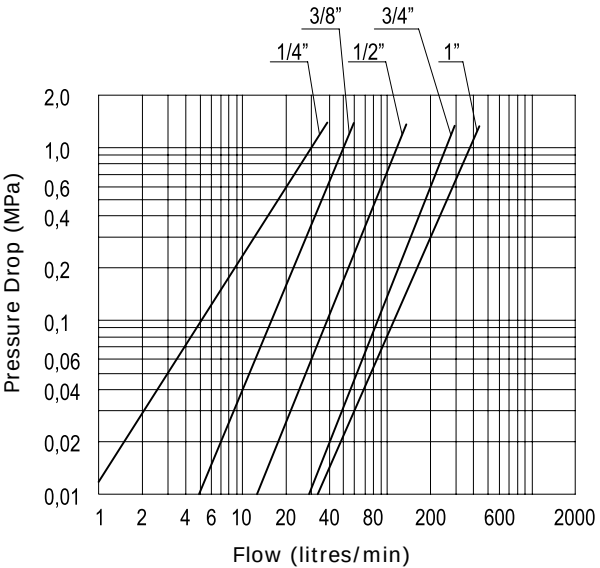
FASTER – PV

Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C



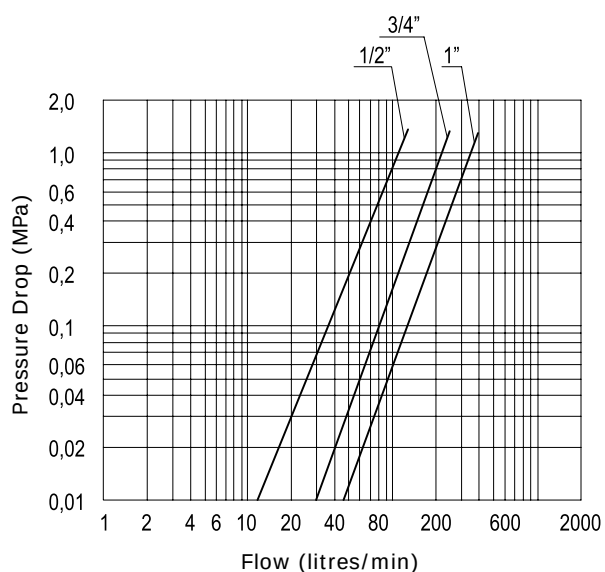
FASTER – FFN

Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C



FASTER – VV

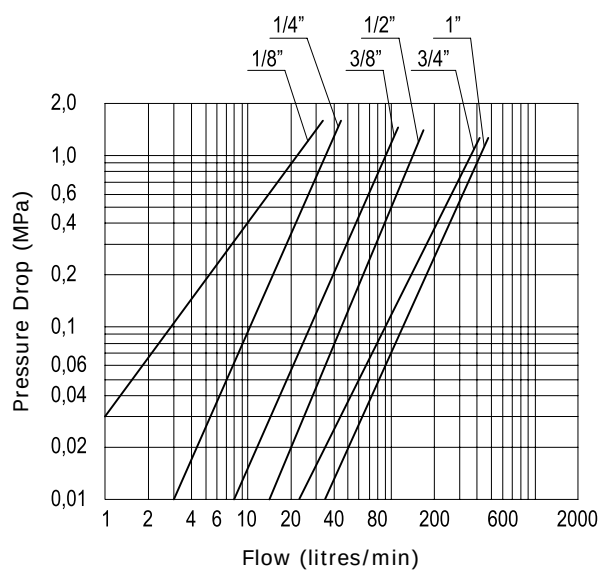
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

**FASTER – FFV**

Mineral oil

Viscosity: 20 Centistokes

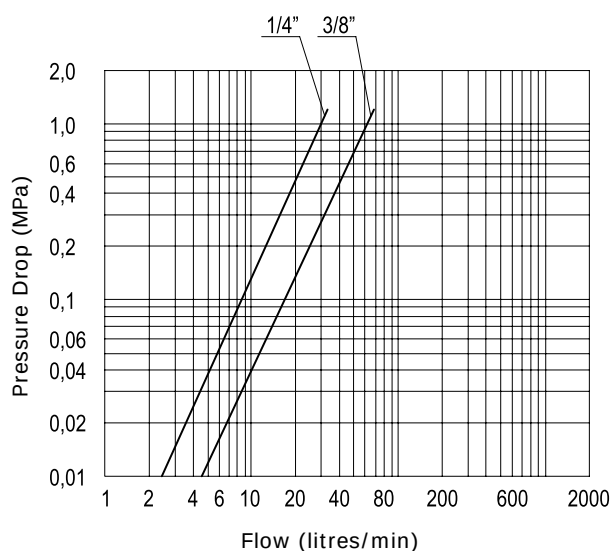
Temperature: 50°C

**FASTER – HNV**

Mineral oil

Viscosity: 20 Centistokes

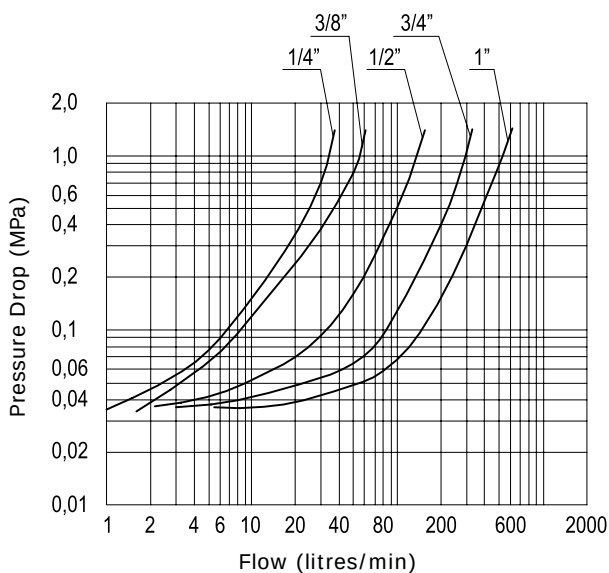
Temperature: 50°C

**FASTER – PVVM**

Mineral oil

Viscosity: 20 Centistokes

Temperature: 50°C

**FASTER – Non-return valve**

Mineral oil

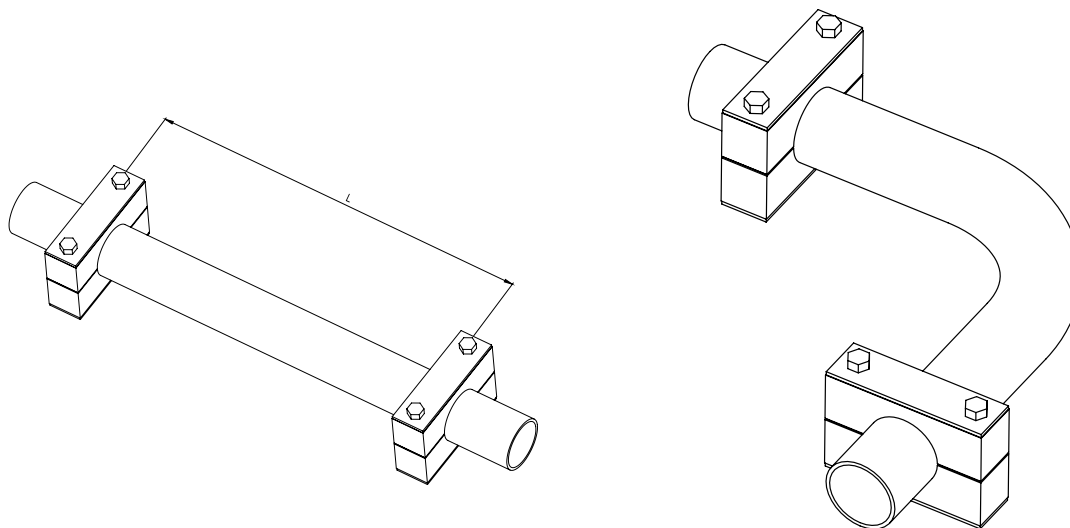
Viscosity: 20 Centistokes

Temperature: 50°C



PIPE CLAMPS

Recommended distance between pipe clamps



The clamp is assembled close to a pipe bend.

	Clamp type	PIPE DIMENSION [mm]	DISTANCE L [m]
Standard series Double series	Group 1	6 – 13.25	0.9
	Group 2	6 – 13.25	1.0
	Group 3	14 – 18	1.2
	Group 4	20 – 25.4	1.5
	Group 5	28 – 32	1.5
	Group 6	32 – 45	2.2
	Group 7	45 – 54	2.7
	Group 8	57.2 – 76.1	3.2
	Group 9	88.9 – 102	4.0
Heavy series	Group 1	6 – 20	1.0
	Group 2	20 – 30	1.5
	Group 3	30 – 45	2.2
	Group 4	38 – 50	2.2
	Group 4	53 – 70	3.0
	Group 5	65 – 73	3.0
	Group 5	80 – 90	3.5
	Group 6	100 – 121	4.5
	Group 7	133 – 168	5.0
	Group 8	168 – 219	6.0
	Group 9	166 – 220	6.7

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